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DEPARTMENT OF STATE

Washington, D.C. 20520

BUREAU OF INTERNATIONAL SCIENTIFIC
AND TECHNOLOGICAL AFFAIRS

U.S.-U.S.S.R. Programs Secretariat

STATINTL

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April 29, 1974

NOTE FOR: CIA - [REDACTED]

SUBJECT: Briefing 9:39 a.m., May 2, 1974

Following is a list of NSF personnel who have been invited by the U.S. Working Group Chairman on Microbiology to the briefing at 9:30 a.m., May 2, Room 924 of the Foundation, 1800 G Street, N.W.

Dr. Joshua Leise (U.S. W.G.C.)
Office of the Deputy Assistant
Director for Research

Dr. Eloise V. Clark
Head of the Molecular Biology Section

Dr. Edward C. Creutz
Assistant Director for Research

Dr. Jerome Fregeau
Executive Assistant to the Deputy Assistant
Director for Research

Dr. Marshall M. Lih
Division of Engineering

Dr. John Mehl
Deputy Division Director
Division of Biological and Medical Sciences

Dr. Richard Ries
Office of International Programs

Dr. John Thomas
Office of International Programs

Dr. Edward Todd
Deputy Assistant Director for Research

file
Microbiology

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Dr. George Tsao
Program Manager for Advanced Technology
Applications

Dr. Israel Warshaw
Deputy Division Director
Division of Engineering

I have been informed by Dr. Leise's secretary that all the above have security clearance through Secret.

In addition to the above, Dr. Arthur Humphrey of the College of Engineering, University of Pennsylvania, and Co-Chairman of the U.S. Group, will also attend the briefing. Dr. Humphrey has received, for the day of the briefing, a Secret security clearance from the Department of State.

It is also possible that one or more of the following from this office may attend the briefing: Dr. Oswald H. Ganley, Dr. Royal Wald, ✓ All have appropriate security clearance.

Miss Adah Sheldon

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Adah Sheldon

PLAN OF ACTION

IN FULFILLMENT OF THE WORKING PROGRAM FOR SCIENTIFIC AND TECHNICAL COOPERATION BETWEEN THE U.S.A. AND U.S.S.R. IN THE FIELD OF "PRODUCTION OF SUBSTANCES BY MICROBIAL MEANS" FOR THE PERIOD JANUARY 1, 1974 TO DECEMBER 31, 1974.

EVENT NO.	EVENT NAME	NUMBER OF PARTICIPANTS		DATE OF ACTION	PLACE	PERIOD OF ACTION		RESPONSIBLE ORGANIZATIONS		REFERENCE BASIS
		USSR	USA			USSR	USA	USSR	USA	
1	3rd Meeting Working Group	10	10	June 10 to June 20	Wash., D.C.	2 weeks		Main Board	NSF & Dept. of State	Recommendation in Record of 2nd meeting Project 1.1
2	Conference on Instrumentation	5	5	Aug. 1974	Phila., USA	2 weeks		Main Board & Kazan Inst.	NSF & U. of P.	Project 1.1
3	Conference on Mechanism of HC uptake by Microbes	5	5	Fall 1974	Moscow, USSR	2 weeks		Main Board & Prot. Synth.	NSF & Kansas State Univ.	Project 2.1
4	Exchange Visits on Computer Control	2	2	1974-75	Kazan MIT J. of P. Widener College	2 faculty for 3 months 2 post-doctorals for 1 year		Main Board	NSF	Project 4.1
5	Joint Book Writing	5	5	1974	Phila., USA in connection with event 2	2 weeks		Main Board	NSF	Project 6.1

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EVENT	EVENT NAME	NUMBER OF PARTICIPANTS	DATE OF ACTION	PLACE	PERIOD OF ACTION	RESPONSIBLE ORGANIZATIONS	REFERENCE BASIS
		USSR	USA			USSR	USA
Research Project on Fermentation Inst.		---	4	begin July 1, 1974	U. of P. 3 years	Main Board	NSF
Research Project on Ferm. Dispersion		4	--	begin July 1, 1974	Kazan Inst. 3 years of Chem. Tech.	Main Board	NSF
Research Project on Theory of HC Uptake by Microbes		10	4	begin July 1, 1974	Inst. Prot. 3 years Synth. & Kansas State Univ.	Main Board	NSF
Research Project Development of Systems for Computer Control of Ferm. Systems		10	8	begin July 1, 1974	Kazan Inst. 3 years Chem. Tech. Univ. of Penna. Mass. Inst. Tech.	Main Board	NSF

PLAN OF ACTION

IN THE FULFILLMENT OF THE WORKING PROGRAM FOR SCIENTIFIC
AND TECHNICAL COOPERATION BETWEEN THE U.S.A. AND U.S.S.R.
IN THE FIELD OF "PRODUCTION OF SUBSTANCES BY MICROBIAL
MEANS" FOR THE PERIOD JANUARY 1, 1974 TO SEPTEMBER 31, 1974.

EVENT NO.	EVENT NAME	NUMBER OF PARTICIPANTS		DATE OF ACTION	PLACE	PERIOD OF ACTION		RESPONSIBLE ORGANIZATIONS	REFERENCE BASIS
		USSR	USA					USSR	USA
10	Polimery-74 Conference	6	6	Sept. 3-16 1974	Moscow	2 wks.		Main Board	NSF Project 4, Task 6
11	Enzyme systems for acoustic imaging and holography	4	4	July 1, 1974	U. Pa. Moscow U.	5 yrs.		Main Board	NSF Project 4, Task 4.2
12	Production of sugar from cellulose	6	6	July 1, 1974	Inst. Biosyn. Protein Sub.	U. Cal. Berkeley		Main Board	NSF Project 4, Task 5.1
13	Fermentable sugars from agricultural solid waste	6	6	July 1, 1974	Inst. Biosyn Protein Sub.	Iowa State Univ.		Main Board	NSF Project 4, Task 5.2
14	Cleavage reversal to produce peptides and fine chemicals	4	4	July 1, 1974	Inst. Biosyn. Protein Sub.	Corning Glass		Main Board	NSF Project 4, Task 5.4
15	Laboratory & Field Visits	4-7	4-7	June 1974	Various Sites	3 wks.		Main Board	NSF Project 5
16	Working Conference	4-7	4-7	July 1974	Beltsville, Md	3-5 days		Main Board	NSF Project 5
17	Research Program	?	?	Begin Sept. 1974	Various Sites	2 yrs.		Main Board	NSF Project 5
18	Exchange of Junior Scientists	4-7	4-7	Begin Sept. 1974	Various Sites	1 yr.		Main Board	NSF Project 5
19	Meeting, ex- change of cultures, & field trips	4-6	4-6	Dec. 1974	Wash., D.C.	2 wks.		Main Board	NSF Project 5

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EVENT NO.	EVENT NAME	NUMBER OF PARTICIPANTS	DATE OF ACTION	PLACE	PERIOD OF ACTION	RESPONSIBLE ORGANIZATIONS	REFERENCE BASIS
USSR	USA					USSR	USA
20	Exchange of Publications	1	July 1, 1974	Cambridge & U.S.S.R.	Continuing	NSF & MIT	Project 1 Task 1
21	Conference Work-Shop on SCP Research	6	Sept. 1974	Cambridge, Mass. USA	3 Days	NSF & MIT	Project 1 Task 2A
22	Choice & Selection of Microorganisms	6	Sept. 1974	USA & USSR	1 Day	NSF & MIT	Project 1 Task 3
23	Research on Cultivation of Yeast and Bacteria on Various Substrates	6	Begin July 1, 1974	M.I.T., U. Pa., U. Missouri	2 Years	NSF	Project 1 Task 4.1 & 4.2
24	Research on Protein Isolation & Release	4	Begin July 1, 1974	M.I.T.	2 Years	NSF	Project 1 Task 5.1 & 5.2
25	Research & Development of Biomass Production	4	Begin July 1, 1974	M.I.T., U. Pa., U. Missouri	2 Years	NSF	Project 1 Task 4.2, 4.2, 4.3
26	Research & Development on Protein Isolation	4	Begin July 1, 1974	M.I.T.	2 Years	NSF	Project 1 Task 5.1 & 5.2
27	Research & Development on Industrial Methods of Biomass Production	4	Begin July 1, 1974	M.I.T.	2 Years	NSF	Project 1 Task 6.1, 6.2, 6.3
28	Biological Value and Toxicity	2	Begin July 1, 1974	M.I.T.	3 Years	NSF	Project 1 Task 8

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EVENT NAME	NUMBER OF PARTICIPANTS	DATE OF ACTION	PLACE	PERIOD OF ACTION	RESPONSIBLE ORGANIZATIONS	REFERENCE		
USSR	USA				USSR	USA	BASIC	
9. Conference on genetics non antibiotic producing cultures	5	5	Spring 1975	Chicago or Seattle	2 days	Main Board	NSF	Project Task 1.0
10. Conference on genetics antibiotic producing cultures	6	6	Spring 1975	Leningrad	3 days	Main Board	NSF	Project Task 1.2
11. Research Projects on genetics of antibiotic producing cultures	3	3	1975	US and USSR	3 years	Main Board	NSF	Project Task 1.3
12. Research projects on cellulose utilization	2	2	1975	US and USSR	2 years	Main Board	NSF & Natick Lab.	Project Task 1.4
13. Annual Conference on research projects (1.3, 1.5)	12	12	Annual	Alternating US and USSR	3 days	Main Board	NSF	Project Tasks 1.3 & 1.5
14. Research projects on genetics of non-antibiotic producing cultures	3	3	1975	to be determined	3 years	Main Board	NSF	Project Task 1.5

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EVENT NAME	NUMBER OF PARTICIPANTS USSR	USA	DATE OF ACTION	PLACE	PERIOD OF ACTION	RESPONSIBLE ORGANIZATIONS USSR	USA	REFERENCE BASIS
35. Exchange of personnel in genetic research projects	6	6	1 from each country - 12 months	US & USSR	3 years	Main Board	NSF	Project Task 1.6
36. Conference on genetic engineering	5	5	Spring 1975	Stanford	4 days	Main Board	NSF	Project Task 1.6
37. Research projects in genetic engineering and molecular biology	3	3	Spring 1976	US & USSR	3 years	Main Board	NSF	Project Task 1.7
38. Workshop on insect control	5	20	Oct. 1974	East Lansing, Mich.	3 days	Main Board	NSF	Project Task 2.1
39. Conference on genetics of insect pathogens	8	5	Spring 1975	Armenia	3 days	Main Board	NSF	Project Task 2.2
40. Research projects on genetics of insect pathogens	3	3	Spring 1976	US & USSR	3 years	Main Board	NSF	Project Task 2.3
41. Research project on <u>B. thuringiensis</u> and <u>B. popilliae</u>	1	1	Spring 1975	Manhattan, Kans, & Armenia	1 year	Main Board	NSF	Project Task 2.4

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EVENT NAME	NUMBER OF PARTICIPANTS		DATE OF ACTION	PLACE	PERIOD OF ACTION		RESPONSIBLE ORGANIZATIONS		REFERENCE
	USSR	USA					USSR	USA	
Conference on re-search projects (2.3)	4	4	Spring 1977 1978	US & USSR	2 days	Main Board	NSF		Project 3 Task 2.3
Conference on mutagenesis and recombination	10	5	Spring 1975	Leningrad	4 days	Main Board	NSF		Project 3 Task 3.1
Research project on genetic analysis	1	1	Spring 1975	Berkeley & Leningrad	3 years	Main Board	NSF		Project 3 Task 3.2
Exchange of personnel in yeast genetics programs	3	3	1 from each country for 12 months	US & USSR	3 years	Main Board	NSF		Project 3 Task 3.2 & 3.3
Conference on research projects	3	3	Annual	Alternating US & USSR	3 days	Main Board	NSF		Project 3 Task 3.2 & 3.3
Research projects on amino acid production	2	1	Fall 1974	Chicago & Armenia	3 years	Main Board	NSF		Project 3 Task 4.1
Research projects on genetic analysis in bacillus	2	2	Fall 1974	Waltham, Mass. Rochester, NY Moscow & Armenia	3 years	Main Board	NSF		Project 3 Task 4.2

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EVENT NO.	EVENT NAME	NUMBER OF PARTICIPANTS USSR	USA	DATE OF ACTION	PLACE	PERIOD OF ACTION	RESPONSIBLE ORGANIZATIONS USSR	USA	REFERENCE BASIS
0.	Exchange of personnel (4.1 & 4.2)	3	3	1 from each country for 12 months	US & USSR	3 years	Main Board	NSF	Project 3 Task 4.1 & 4.2
1.	Conference on research projects (4.1 & 4.2)	3	3	Annual	Alternating 3 days US & USSR		Main Board	NSF	Project 3 Task 4.1 & 4.2
2.	Symposium on genetic methods to be published in book	20	20	1979	US or USSR 1 week		Main Board	NSF	Project 3 Task 4.3 (summary 14)

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PROJECT NO. 1PROJECT COORDINATOR Dr. Gregorian, U.S.S.R. and Dr. Daniel I.C. Wang, M.I.T., U.S.A

WORKING PROGRAM Development of Technology for Industrial Production
and Utilization of Food and Feed Proteins by Microbial
Means, Including Research into Different Aspects of Toxicity
PROJECT TITLE and Biological Value of Such Products

TASK NUMBER	NAME OF TASK OR SUB-TASK	NAME OF PARTICIPANTS AND COOPERATING INSTITUTIONS U.S.S.R. U.S.	DATE AND DURATION OF TASK	FORMS OF COOPERATION	EXPECTED RESULTS
1	Exchange of Publications	Gregorian D.I.C. Wang M.I.T.	July, 1974 and continuing	Exchange of Publications and Conference Reports	Establish and Continue Basis of Communication
2A	ARRANGE WORK-SHOP MEETINGS ON SINGLE-CELL PROTEIN RESEARCH (PART A)		TOTAL: 20 U.S. PART. AND 6 U.S.S.R. PART DURATION: 3 DAYS		
2.1	Biological Value and Toxicity	V. Young, M.I.T. N. Scrimshaw, M.I.T. B. Oser, F & D Res. Lab. D. Calloway, U. Cal	Fall, 1974	Meet in U.S.A.	Planning, Initiating, and Reporting on Cooperative Programs
2.2	Selection of Microbe Substrate Systems	D.I.C. Wang, M.I.T. C.L. Cooney, M.I.T. C. Dunlap, U. Missouri A. Laskin, Esso C. Wilke, U. Calif. J. Litcheffeld, Battelle E. Field, Std. Ind. A. Humphrey, U. of Pa. G. Tsao, N.S.F.	Fall, 1974	Meet in U.S.A.	
2.3	Single-Cell Protein For Food	S.R. Tannenbaum, M.I.T. C.C. McDonald, DuPont C. Atkins, Std. Ind. C. Rha, M.I.T. M. Milner, UN (PAG) T. Labuza, Univ. Minn.	Fall, 1974	Meet in U.S.A.	
2.4	Methods of Decreasing Nucleic Acid Content	A.J. Sinskey, M.I.T. S.R. Tannenbaum, M.I.T.	Fall, 1974	Meet in U.S.A.	

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PROJECT NO. 1

WORKING PROGRAM Development of Technology for Industrial Production and Utilization of Food and Feed Proteins by Microbial

PROJECT TITLE Means, Including Research into Different Aspects of Toxicity and Biological Value of Such Products
PROJECT COORDINATOR Dr. Gregorian, U.S.S.R. and Dr. Daniel I.C. Wang, M.I.T., U.S.A.

<u>TASK NUMBER</u>	<u>NAME OF TASK OR SUB-TASK</u>	<u>NAME OF PARTICIPANTS AND COOPERATING INSTITUTIONS U.S.S.R. U.S.</u>	<u>DATE AND DURATION OF TASK</u>	<u>FORMS OF COOPERATION</u>	<u>EXPECTED RESULTS</u>
2B	ARRANGE WORK-SHOP MEETINGS ON SINGLE-CELL PROTEIN RESEARCH (PART 2) TOTAL: 20 U.S.S.R. PART & 6 U.S. PART DURATION: 3 DAYS				
2.1	Biological Value and Toxicity	N.S. Scrimshaw, M.I.T.	Fall, 1975	Meet in U.S.S.R.	Planning, Initiating, and Reporting on Cooperative Program
2.2	Selection of Microbe-Substrate Systems	D.I.C. Wang, M.I.T. E. Field, Std. Ind.	Fall, 1975	Meet in U.S.S.R.	"
2.3	Single-Cell Protein for Food	C. Rha, M.I.T. M. Milner, UN (PAG)	Fall, 1975	Meet in U.S.S.R.	"
2.4	Methods for Decreasing Nucleic Acid Content	S.R. Tannenbaum, M.I.T.	Fall, 1975	Meet in U.S.S.R.	"

PROJECT NO. 1PROJECT COORDINATOR Dr. Gregorian and Dr. Wang

WORKING PROGRAM Development of Technology for Industrial Production
and Utilization of Food and Feed Proteins by Microbial
Means, Including Research into Different Aspects of Toxicity
and Biological Value of Such Products

<u>TASK NUMBER</u>	<u>NAME OF TASK OR SUB-TASK</u>	<u>NAME OF PARTICIPANTS AND COOPERATING INSTITUTIONS U.S.S.R. U.S.</u>	<u>DATE AND DURATION OF TASK</u>	<u>FORMS OF COOPERATION</u>	<u>EXPECTED RESULTS</u>
WORKING PROGRAM OF SIX PROBLEM TOPICS					
3	CHOICE AND SELECTION OF MICROORGANISMS				
3.1	Selection of Bacterial and Yeast Culture	R. Donovick, ATCC NRRL Cult. Coll. G. Silverman, U.S. Natick M.I.T. Univ. of Wis. I.S.U.	Fall, 1974 and Continuing	Microbial Culture Exchange	Establish and Broaden Existing Cultures
3.2	Regulation and Control Amino Acid Content of SCP	A.L. Demain, M.I.T. S.R. Tannenbaum, M.I.T.	Fall, 1974 1 Day and Continuing	Meet in U.S.A. Exchange of Existing Research Results	Review Past Progress and Establish New Techniques
4	RAW MATERIAL AND ECONOMIC ANALYSIS OF SCP PRODUCTION				
4.1	Cultivation of Yeast on Molasses, Ethanol, Methanol, Hydrocarbons, With Techno-Economic Analysis	D.I.C. Wang, M.I.T. (Hydrocarbons) C.L. Cooney, M.I.T. (Methanol) A.E. Humphrey U. of Pa. (Molasses)	Two Years (1974-1976) Two Years (1974-1976) Two Years (1974-76) (U. of Pa.)	Exchange of Reports	Forecast and Specify Economically feasible substrates for SCP Production
4.2	Cultivation of Bacteria on Methanol, Ethanol, Agricultural	G. Dunlap, U. Missouri (Cellulose)	Two Years (1974-1976) U. of Missouri	Exchange of Reports	"
4.3	Comparison of Basic Variables & Choice of Substrate	M.I.T. U. of Pa. U. Missouri	One Week Fall, 1975	Conference to Discuss Progress, Analysis of Results from 4.1 & 4.2 at M.I.T. USA- 5 USA Part. 5 USSR Part.	Establish Status on Raw Material Best Suited With Optimistic Economic Potentials

PROJECT NO. 1PROJECT COORDINATOR Dr. Gregorian and Dr. Wang, M.I.T.

WORKING PROGRAM Development of Technology for Industrial Productions
PROJECT TITLE Means, Including Research into Different Aspects of
Toxicity and Biological Value of Such Products

TASK NUMBER	NAME OF TASK OR SUB-TASK	NAME OF PARTICIPANTS AND COOPERATING INSTITUTIONS U.S.S.R. U.S.	DATE AND DURATION OF TASK	FORMS OF COOPERATION	EXPECTED RESULTS
5	DEVELOPMENT OF METHODS FOR PROTEIN ISOLATION FROM UNICELLULAR MICROORGANISMS				
5.1	Development of Enzymatic & Mechanical Methods of Protein Release	D.I.C. Wang, M.I.T. (Release)	Two Years (1974-1976)	Exchange of Research Report	Information Exchange change to Establish Technical and Economic Feasibilities
5.2	Development of Techniques For Reduction of Nucleic Acids By Enzymatic & Physico- Chemical Means	A.J. Sinskey, M.I.T. S.R. Tannenbaum, M.I.T.	Two Years (1974-1976)	Exchange of Research	Information Exchange and Establish Technical and Economic Feasibilities
6	DEVELOPMENT OF INDUSTRIAL METHODS OF BIOMASS PRODUCTION				
6.1	Fermentor Apparatus Design & Scale-up	D.I.C. Wang, M.I.T.	Two Years (1974-1976)	Exchange of Reports	Establish Report on Fermentor Design Most Optimal for SCP Cultivation
6.2	Biomass Recovery	D.I.C. Wang, M.I.T.	Two Years (1974-1976)	Exchange of Reports	Define Process Parameters for Most Economic Means of Biomass Recovery
6.3	Purifying & Drying	T. Labuza, U. Minn.	Two Years (1974-1976)	Exchange of Reports	Establish & Process
6.4	Elaboration on Increased Capacity (Scale-up) For Biomass Purification and Production; Overall Process Evaluation; Economic Analysis	D.I.C. Wang, M.I.T. T. Labuza, U. Minn.	2 Months Fall, 1977	Work-shop with Specific Processes 5 US Part.; 5 USSR Part. Meet in USSR	Establish Techno- Economic Basis for Scale-up of Biomass Purification & Production

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WORKING PROGRAM Development of Technology for Industrial Production and
Utilization of Food and Feed Proteins by Microbial
Means Including Research into Different Aspects of Toxicity
Project Title and Biological Value of Such Products

PROJECT NO. 1
 PROJECT COORDINATOR Dr. Gregorian, U.S.S.R. and Dr. Daniel I.C. Wang, M.I.T.

TASK NUMBER	NAME OF PARTICIPANTS TASK OR SUB-TASK AND COOPERATING INSTITUTIONS U.S.S.R. U.S.	DATE AND DURATION OF TASK	FORMS OF COOPERATION	EXPECTED RESULTS
7	SPECIAL TREATMENT OF BIOMASS AND ISOLATED PROTEIN THEREFROM FOR USE IN PREPARATION OF FOODS			
7.1	Protein Isolation, Characterization of SCP	C. Rha, M.I.T.	Two Years (1975-1977)	Exchange of Research Reports Definition of Protein Isolation & Characterization of Isolated SCP
7.2	Protein Utilization in Preparation of Foods	T. Labuza, U. Minn.	Two Years (1975-1977)	Exchange of Research Reports Establish Protocol & Potential Routes of Prepared Foods From SCP
8	BIOLOGICAL VALUE AND TOXICITY			
	A.A. Pokrovsky Nutrition Institute	N.S. Scrimshaw, M.I.T.	Three Years (1974-1977)	Exchange of Reports Establish Safety of SCP

WORKING PROGRAM

Project No. 2

PROJECT TITLE:

Engineering Research and Development of Equipment and Methods for the Computerized Simulation, Design and Control of Processes for Microbial Technology

PROJECT COORDINATORS:

Dr. Shamil Yenikev, Kazan Institute Chemical Technology
Dr. Arthur Humphrey, University of Pennsylvania

TASK NUMBER	NAME OF TASK OR SUB-TASK	NAME OF PARTICIPANTS AND COOPERATING INSTITUTIONS U.S.S.R. U.S.	DATE AND DURATION OF TASK	FORMS OF COOPERATION	EXPECTED RESULTS
1.	Development of techniques and new sensors for measuring the significant variables in microbial processes and assembling equipment for experimental investigations.				
1.1	Conference and position paper on needed instrumentation	Yenikev Kazan Inst. Chem. Tech.	Humphrey Univ. of Penna.	one week summer 1974	conference at Univ. of Penna. 5 USSR part. 5 US part. instrumentation
1.2	Development of Instrumentation relative to measurement of biomass (including computer interface & software)	_____	Humphrey Univ. of Penna.	two years 1974-1976	exchange of research reports two man years
1.3	Development of Instrumentation relative to measurement of microbial activity (including interface & software)	_____	Humphrey Univ. of Penna.	two years 1974-1976	exchange of research reports two man years
1.4	Development of Instrumentation relative to measurement of system dispersion (including interface & software)	Yenikev Kazan Inst. Chem. Tech.	_____	two years 1974-1976	exchange of research reports equipment & theory development

WORKING PROGRAM

Project No. 2

PROJECT TITLE:

Engineering Research and Development of Equipment and Methods for the Computerized Simulation, Design and Control of Processes for Microbial Technology

PROJECT COORDINATORS:

Dr. Shamil Yenikev, Kazan Institute Chemical Technology
Dr. Arthur Humphrey, University of Pennsylvania

TASK NUMBER	NAME OF TASK OR SUB-TASK	NAME OF PARTICIPANTS AND COOPERATING INSTITUTIONS U.S.S.R. U.S.	DATE AND DURATION OF TASK	FORMS OF COOPERATION	EXPECTED RESULTS
2.	Investigation of momentum, heat, and mass transfer in heterogeneous gas-liquid-liquid type of culture condition				
2.1	Conference on mechanisms of hydrocarbon uptake by micro-organism	? Inst. Protein Synth. USSR	Erickson Kansas State Univ. one week fall 1974	conference at Inst. Prot. Synth. Moscow, USSR 5 USSR part. 5 US part.	Report on status & theory of HC uptake by microbes
2.2	Development of hydro-dynamical theory for heterogeneous gas-liquid-liquid microbial culture	_____	Erickson Kansas State Univ. two years 1974-1976	exchange of research reports	theory development
2.3	Development of experimental apparatus and taking of data for creation of a hydro-dynamical model of the heterogeneous gas-liquid-liquid fermentation system	Yenikev Kazan Inst. Chem. Tech.	_____ two years 1974-1976	exchange of research results	equipment development

WORKING PROGRAM

Project No. 2

PROJECT TITLE:

Engineering Research and Development of Equipment and Methods for the Computerized Simulation, Design and Control of Processes for Microbial Technology

PROJECT COORDINATORS:

Dr. Shamil Yenikev, Kazan Institute Chemical Technology
Dr. Arthur Humphrey, University of Pennsylvania

TASK NUMBER	NAME OF TASK OR SUB-TASK	NAME OF PARTICIPANTS AND COOPERATING INSTITUTIONS U.S.S.R.	U.S.	DATE AND DURATION OF TASK	FORMS OF COOPERATION	EXPECTED RESULTS
3.	Research on microbial population dynamics of heterogeneous systems					
3.1	Development of a kinetic theory for behavior of microbes in a heterogeneous system	_____	Erickson Kansas State Univ.	two years 1974-1976	exchange of research reports	model develop- ment
3.2	Development of experimental apparatus and taking of data for creation of a model for microbial population behavior in a heterogeneous system	Yenikev Kazan Inst. Chem. Tech.	_____	two years 1974-1976	exchange of research reports	creation of a model for computer control appl.
3.3	Conference to integrate results of tasks 1, 2 and 3 and to assist in the design of the experimental demonstration unit (at Inst. Protein Synth.)	? Inst. Prot. Synthesis Yenikev Kazan Inst. Chem. Tech.	Humphrey Univ. of Penna. Erickson Kansas State Univ.	one month summer 1976	working conf. on equip. design	equipment design & specifica- tions

WORKING PROGRAM

Project No. 2

PROJECT TITLE:

Engineering Research and Development of Equipment and Methods for the Computerized Simulation, Design and Control of Processes for Microbial Technology

PROJECT COORDINATORS:

Dr. Shamil Yenikev, Kazan Institute Chemical Technology
Dr. Arthur Humphrey, University of Pennsylvania

TASK NUMBER	NAME OF TASK OR SUB-TASK	NAME OF PARTICIPANTS AND COOPERATING INSTITUTIONS	DATE AND DURATION OF TASK	FORMS OF COOPERATION	EXPECTED RESULTS
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4. Development of Engineering techniques for optimal design of industrial scale fermentor and automatic control of industrial fermentation processes

- 4.1 Exchange visits in order to coordinate the plans for the computer coupled fermentation control systems
- | | | | | |
|---------------------------------------|---|---|--------------------|------------------------------|
| Yenikev
Kazan Inst.
Chem. Tech. | Humphrey
Univ. of
Penna.
Cooney-Mass.
Inst. Tech.
Jefferts
Widener
College | two men
(each side)
exchange
visits one
at post-
doctoral
level for
one year, one
at faculty
level for
three months | exchange
visits | informa-
tion
exchange |
|---------------------------------------|---|---|--------------------|------------------------------|

- 4.2 Investigation on both the theoretical and practical aspects of computer control of fermentation systems
- | | | | | |
|---------------------------------------|---|--|---|---|
| Yenikev
Kazan Inst.
Chem. Tech. | Cooney-Mass.
Inst. Tech.
Humphrey
Univ. of
Penna. | 1974-1976
two men years
M.I.T. one
man year
U. of P. | exchange
of results
and exper-
ience | knowledge
in compu-
ter contro
systems
plus soft-
ware devel
opment |
|---------------------------------------|---|--|---|---|

WORKING PROGRAM

Project No.2

PROJECT TITLE:

Engineering Research and Development of Equipment and Methods for the Computerized Simulation, Design and Control of Processes for Microbial Technology

PROJECT COORDINATORS:

Dr. Shamil Yenikev, Kazan Institute Chemical Technology
Dr. Arthur Humphrey, University of Pennsylvania

TASK NUMBER	NAME OF TASK OR SUB-TASK	NAME OF PARTICIPANTS AND COOPERATING INSTITUTIONS	DATE AND DURATION OF TASK	FORMS OF COOPERATION	EXPECTED RESULTS
4.3	Investigation of both the theoretical and practical aspects of computer control of fermentation systems	Yenikev-Kazan Inst. Chem.Tech. Coony-M.I.T. Humphrey-U. of Penn.	1974-1976 two men years M.I.T. one man year U. of P.	exchange of results and experience	knowledge in computer control systems plus software development
5	Design and demonstration of practical system for computer control of fermentation system for the production of single cell protein from hydrocarbon substrates				
5.1	Conference to coordinate total design information	Yenikev-Kazan Inst. Chem.Tech. ? Inst.Protein Synth. Humphrey-U. of P. Erickson-Kansas State U. Cooney-M.I.T. Jefferis-Widener Univ.	two weeks Fall 1976	conference with key people in attendance approx. 5 from each side	specification of final design & trial runs
5.2	Design and Construction of the computer controlled fermentation unit	? Inst. Protein Synth.	---- one year 1976-1977	Consultation on design and construction	optimally designed practical computer controlled fermentor

WORKING PROGRAM

Project No.2

PROJECT TITLE:

Engineering Research and Development of Equipment and Methods for the Computerized Simulation, Design and Control of Processes for Microbial Technology

PROJECT COORDINATORS:

Dr. Shamil Yenikev, Kazan Institute Chemical Technology
Dr. Arthur Humphrey, University of Pennsylvania

TASK NUMBER	NAME OF TASK OR SUB-TASK	NAME OF PARTICIPANTS AND COOPERATING INSTITUTIONS	DATE AND DURATION OF TASK	FORMS OF COOPERATION	EXPECTED RESULTS
5.3	Demonstration of optimal control of SCP fermentation through use of computer	? at appropriate site in USSR	Summer 1978	Consultations	optimal SCP process
6	JOINT WRITING AND PUBLISHING OF BOOK ON	COMPUTER SIMULATION, DESIGN & CONTROL OF			
		FERMENTATION SYSTEMS			
6.1	Meetings to plan & outline joint book	Yenikev- Kazan Inst.Chem. Tech.	Humphrey- U. of P. Summer 1974	Planning of joint book	Book outline & chapter assignments
6.2	Writing of individual Chapters	Yenikev- Kazan Inst.Chem. Inst.	Humphrey- U. of P. 1974-1976	Exchange and criticism of Chapters	Book manuscript
6.3	Editing and Publishing of Book	Yenikev- Kazan Inst.Chem. Inst.	Humphrey- U. of P. 1976	Editing book in both Russian and English	Jointly Published Book

WORKING PROGRAM

PROJECT NO. 3

PROJECT TITLE Genetics of Industrial Microorganisms

PROJECT COORDINATOR Dr. Halvorson and Dr. Brown, USA and Dr. S. Alikhanian, USSR

NAME OF TASK OR SUB-TASK	NAME OF PARTICIPANTS AND COOPERATING INSTITUTIONS	DATE AND DURATION OF TASK	FORMS OF COOPERATION	EXPECTED RESULTS
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Development of genetic methods for improving industrial microorganisms based on approaches of molecular biology.

1.1 Conference to develop plans on genetics of non antibiotic producing cultures

S.I. Alikhanian Inst. Genetics & selection of industrial micro-organisms Moscow	H. Halvorson Brandeis U, Waltham, Mass.	1-2 days 1975 either with ASM or GSA annual meeting	Conference 5 USSR part. 5 USA part.	Design of research projects
---	---	--	---	-----------------------------------

1.2 Conference to develop plans on the genetics of antibiotic producing cultures

G.I. Gerasimov Institute of New Antibiotics, Moscow	A. Demain, MIT D. Perlman, School of Pharmacy, U. of Wisconsin, Madison	2-3 days 1975	Conference	Design of research projects
I. Tereshin Institute of Antibiotics, Leningrad	V.R. Brown, Squibb & Company			
S. Novoshtin Institute of Antibiotics, Moscow	G. Bradley Medical College of Virginia, Richmond			

1.3 Genetics of Antibiotic producing cultures

See 1.2

See 1.2

3 years
1975-8

Exchange of results and personnel.
3 man years
USSR
3 man years
USA

WORKING PROGRAM

PROJECT NO. 3

PROJECT TITLE Genetics of Industrial Microorganisms

PROJECT COORDINATORS Dr. Halvorson and Dr. Brown, USA and Dr. S. Alkhanian, USSR

TASK NUMBER	NAME OF PARTICIPANTS AND COOPERATING INSTITUTIONS U.S.S.R. U.S.	DATE AND DURATION OF TASK	FORMS OF COOPERATION	EXPECTED RESULTS
1. (Continued)				
1.4 Development of improved methods for cellulose utilization	<u>L. Erokhid, ?</u> Moscow	2 years 1975-6	Exchange of reports strains 2 man years USA 2 man years USSR at Post Doc. Level	Improved enzyme production and fermentation technology
1.5 Genetics of non antibiotic producing cultures	<u>M. Mandels</u> Natick, Mass	2-3 years starting 1975-6	Specific research projects Exchange of information	Coordinating research. Increased yields
1.6 Conference on genetic engineering	<u>V.N. Krylov</u> Institute of Genetics & Selection of Industrial Microorganisms, Moscow	3-4 days 1975-6 Stanford	Conference 5 USSR in conjunction with an international meeting	Exchange of information & approaches
1.7 Use of genetic engineering and molecular biology for strain development	<u>M.F. Shemyakin</u> Institute of Molecular Biology, Moscow <u>P. Wensink</u> Brandeis U., Waltham, Mass. <u>R. Schleif</u> Inst. of Biochem- and Physiology of Microorg., Moscow	3 years 1976	Coordinated research projects on selected model systems	Improved development of selective microbial systems for genetic engineering

WORKING PROGRAM

PROJECT NO. 3

PROJECT TITLE

Genetics of Industrial Microorganisms

PROJECT COORDINATORS Dr. Halvorson and Dr. Brown, USA and Dr. S. Alkhanian,

USSR

NAME OF
TASK OR
SUB-TASK

NAME OF PARTICIPANTS
AND COOPERATING INSTITUTIONS
U.S.S.R. U.S.

DATE AND
DURATION OF
TASK

FORMS OF
COOPERATION

EXPECTED
RESULTS

1. (Continued)

1.7 (continued)

M.I. Matvienko
Inst. of Biochem.
and Physiology of
Microorgan.,
Pouchino

PROJECT NO. 3

WORKING TITLE

PROJECT TITLE Genetics of Industrial Microorganisms

PROJECT COORDINATORS Dr. Halvorson and Dr. Brown, USA and Dr. S. Alkhanian, USSR

TASK NUMBER	NAME OF PARTICIPANTS AND COOPERATING INSTITUTIONS	DATE AND DURATION OF TASK	FORMS OF COOPERATION	EXPECTED RESULTS
2	Development of methods for genetic analysis for insect control			
2.1	Workshop and development of research projects	3 days Oct. 1974	Workshop in connection with spores VII. E. Lansing, Mich. 5 USSR Particl. 20 USA particl.	Research project design Exchange of information
2.2	Physiology and genetics of insect pathogens	3 days 1975	Conference in Armenia 5 USA particl. 8 USSR particl.	Planning of research programs

E. Afrikian P. Genhardt
Inst. Microbiol Mich. State U.,
Abovian, Armenia E. Lansing, Mich.
I.A. Zakharov
Kostantinov Inst.
of Nuclear Physics,
Leningrad
I. Domaradsky
Extrachromosome
Genetic Lab.,
Moscow

M.G. Oganesian G. St. Julian
Inst. of Genetics USDA Peoria, Ill.
& Selection of
Industrial Micro-
organ., Armenia
Branch
V.V. Sukhodolets R. Hansen
Inst. Genetics & U. of Wisc.,
Selection of In- Madison
dustrial Micro-
organ., Moscow

WORKING PROGRAM

PROJECT NO. 3

PROJECT TITLE Genetics of Industrial Microorganisms

PROJECT COORDINATORS Dr. Halvorson and Dr. Brown, USA and Dr. S. Alikhanian, USSR

TASK NUMBER	NAME OF PARTICIPANTS AND COOPERATING INSTITUTIONS	DURATION AND DATE AND TASK	FORMS OF COOPERATION	EXPECTED RESULTS
2 (Continued)				
2.3	Improved development of insect pathogens participants to be determined by 2.2	3 years 1976-9	Cooperative research support Exchange of post-doctoral fellows	Strain and yield improvement

2. Physiology and genetics of Bacillus thuringiensis and Bacillus popilliae

	<u>E. Afrikian</u>	<u>L. Bulla</u>	<u>1 year 1975-6</u>	<u>Postdoctoral or senior scientist exchange</u>	<u>Improved toxin production</u>
	Inst. Microbio. Ahoyian, Armenia	USDA Grain Marketing Research Center, Manhattan, Kansas			

WORKING PROGRAMPROJECT NO. 3PROJECT TITLE Genetics of Industrial MicroorganismsPROJECT COORDINATORS Dr. Halvorson and Dr. Brown, USA and Dr. S. Alkhanian, USSR

TASK NUMBER	NAME OF TASK OR SUB-TASK	NAME OF PARTICIPANTS AND COOPERATING INSTITUTIONS	DATE AND DURATION OF TASK	FORMS OF COOPERATION	EXPECTED RESULTS
3	Development of genetic methods to improve industrial strains of yeasts, including utilization of hydrocarbons, methanol, etc.				
3.1	Conference on mutagenesis and recombination in yeasts	<u>S.G. Inge-Vechtomov</u> <u>Dept. Genetics,</u> <u>Leningrad U.</u>	<u>4-5 days 1975</u>	Conference Leningrad 5 USA 10 USSR	Theory of mutagenesis as applied to strain selection
3.2	Selection of hydrocarbon utilization yeasts	<u>S.G. Inge-Vechtomov</u> <u>Dept. Genetics,</u> <u>Leningrad U.</u>	<u>3 years 1975-8</u>	Research support postdoctoral exchange	Improved production of hydrocarbon utilizing yeasts
3.3	Improved methods for genetic analysis in yeasts	<u>B.V. Simmon</u> <u>Dept. Genetics</u> <u>Leningrad U.</u>	<u>3 years 1975-8</u>	Research support Postdoctoral exchange	Improved theory and methods for meiosis and sporulation

WORKING PROGRAMPROJECT NO. 3PROJECT TITLE Genetics of Industrial MicroorganismsPROJECT COORDINATORS Dr. Halvorson and Dr. Brown, USA and Dr. S. Alkhanian, USSR

TASK NUMBER	NAME OF TASK OR SUB-TASK	NAME OF PARTICIPANTS AND COOPERATING INSTITUTIONS	DATE AND DURATION OF TASK	FORMS OF COOPERATION	EXPECTED RESULTS
4	Development of methods of genetic analysis of microorganisms for the production of amino acids				
4.1	Construction of genetic strains for amino acid production				
		<u>M.G. Oganessian</u> Inst. of Genetics & Selection of Ind. Microorgan., Armenia	<u>J. Shapiro</u> U. of Chicago, Chicago, Ill.	Cooperative research support Postdoctoral exchange	Improved strain development
		<u>N.I. Zhdanova</u> same, Moscow			
4.2	Development of viruses systems for genetic analysis in <u>Bacillus</u>				
		<u>V.V. Sukhodolets</u> Inst. Genetics & Select. of Microorgan., Moscow	<u>H. O. Halvorson</u> Brandeis U. Waltham, Mass.	Joint research projects. Exchange of personnel	Improved genetic system
		<u>M.G. Oganessian</u> Inst. Genetics & Select. of Microorgan., Armenia	<u>F. Young</u> Rochester Medical School, Rochester, N.Y.		
4.3	Symposium on Genetic Methods				
		Summary of projects 1-4	1 week 1979	Final reports projects	Publish book on conference

WORKING PROGRAM

PROJECT NO. 4

PROJECT TITLE Enzyme Applications

PROJECT COORDINATOR G.T. Tsao (U.S.A.)

I. Berezin and K. Kalunyan (U.S.S.R.)

TASK NUMBER	TASK OR SUBTASK	AND COOPERATING INSTITUTIONS	DURATION OF TASK	FORMS OF COOPERATION	EXPECTED RESULTS
1	Search and isolation of enzyme producing strains of microorganisms and tissue cultures				
	1.1 Strain selection	Moscow State Univ. N.S.F. Grantees Inst. for Protein Syn. Inst. for Chem. of Natural Prod. Tollin Poly. Inst.	5 yrs.	exchange and testing more productively to compare strains	more productive strains
	1.2 Microbial Physiology	same	5 yrs.	joint research projects	more productive strains
2	Commercial isolation and purification of enzymes				
	2.1 Enzyme isolation	same	5 yrs.	joint research projects	processes and equipments for enzyme production
	2.2 Process development	same	5 yrs.	joint research projects	
	2.3 Stabilization of enzymes	same	5 yrs.	joint projects	
	2.4 Equipment design	same	5 yrs.	joint projects	

WORKING PROGRAMS

PROJECT NO. 4

PROJECT TITLE Enzyme Applications

PROJECT COORDINATOR G.T. Tsao, I. Berezin & K.A. Kalunyan

TASK NUMBER	NAME OF TASK OR SUB-TASK	NAME OF PARTICIPANTS AND COOPERATING INSTITUTIONS	DATE AND DURATION OF TASK	FORMS OF COOPERATION	EXPECTED RESULTS
3	Immobilized Enzymes				
	3.1 Theoretical analysis and modelling	Moscow Univ. N.S.F. Grantees	5 yrs.	joint projects	development and understanding of new industrial processes
	3.2 Carrier selection	several institutions	5 yrs.	joint projects	
	3.3 Multienzyme and/or cofactor systems	same	5 yrs.	joint projects	
4	Diagnostic and Analytical Uses of Immobilized Enzymes				
	4.1 Enzyme-immune essay	NSF Grantees	5 yrs.	joint projects	new diagnostic techniques
	4.2 Enzyme detection of faint light or sound	Moscow Univ. Univ. of Penn. Berrain Graves Others	5 yrs.	joint projects	

WORKING PROGRAMS

PROJECT NO. 4

PROJECT TITLE Enzyme Applications

PROJECT COORDINATOR G.T. Tsao, I. Berezin & K.A. Kalunyan

Release 2001/08/27 : CIA-RDP79-00798A000400100096

NUMBER	NAME OF TASK OR SUB-TASK	NAME OF PARTICIPANTS AND COOPERATING INSTITUTIONS	DATE AND DURATION OF TASK	FORMS OF COOPERATION	EXPECTED RESULTS
	Technology of Enzymatic Cleavages				
	5.1 Production of sugar from cellulose	L.S. Losyakova Inst. of Biosyn. of Protein Sub.	5 yrs.	joint project	USE OF ENZYMES IN AGRICULTURE
	5.2 Fermentable sugars from agricultural wastes	L.S. Losyakova Burnet and Lee	5 yrs.	joint project	
	5.3 Enzyme production of milk substitutes		5 yrs.	joint project	
	5.4 Cleavage reversal to make peptides and fine chemicals	same Corning Glass Weetal	5 yrs.	joint project	
	Participation in Polymery 74 Conference Symposium on Production and Properties of Immobilized Enzymes				
	Berezin Tsao				

WORKING PROGRAM

PROJECT NO. 5

PROJECT TITLE Microbiological Control of Pests of Agricultural Crops

PROJECT COORDINATORS Dr. A. Heimpel, USDA, USA and Dr. Olga A. Alisshina

Approved For Release 2001/08/27 : CIA-RDP79-00798A000400100011-1

TASK NUMBER	NAME OF TASK OR SUB-TASK	NAME OF PARTICIPANTS AND COOPERATING INSTITUTIONS U.S.S.R. U.S.	DATE AND DURATION OF TASK	FORMS OF COOPERATION	EXPECTED RESULTS
1	Sporulation of Milky Disease Bacteria				
	Exchange of publication & bacterial cultures	N. Acad. Armenian, USSR, Kiev, Moscow	Cornell Exp. St. Geneva, N.Y. ARS, Beltsville, Md.	Start 7/74 continual exchange	Establishment of virulent strains for further work
2	Working planning meetings on problems 2 & 3	"	" + other participants (3 days) late Fall 1974	Meeting in US 6-7 US 6-7 USSR	Plan cooperative program
3	Research on survey & basic	"	" January 1975-1976	Cooperative Research, Correspondence	Partial sporulation possibly successful method
4	Second work planning meeting on problems	"	" Spring 1977	Meeting in USSR 8-10 US 8-10 USSR	Plan future program
5	Final meeting to prepare report	"	" Early Spring 1978	Meeting in US	Prepare final report

Approved For Release 2001/08/27 : CIA-RDP79-00798A000400100011-1

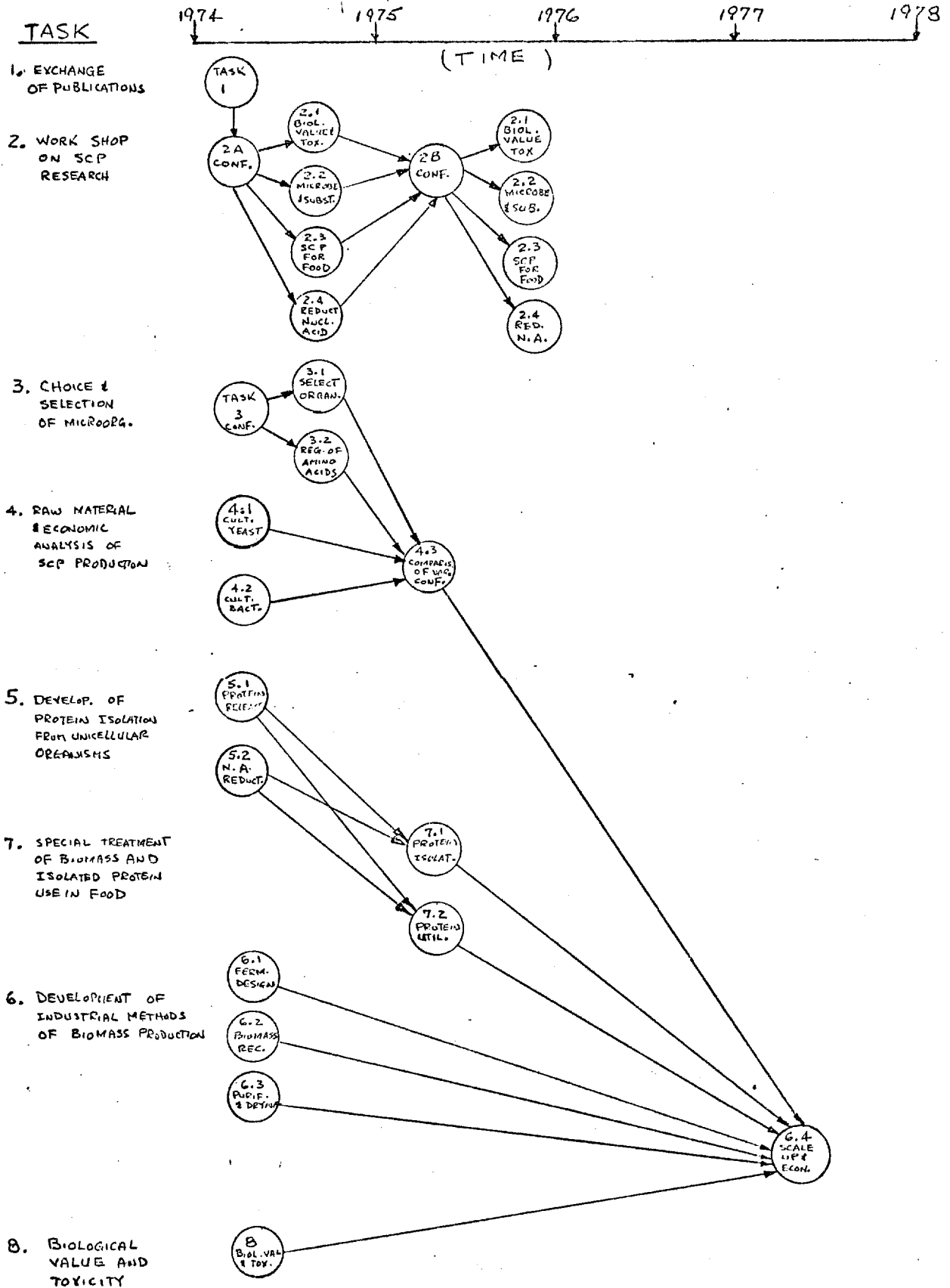
WORKING PROGRAM

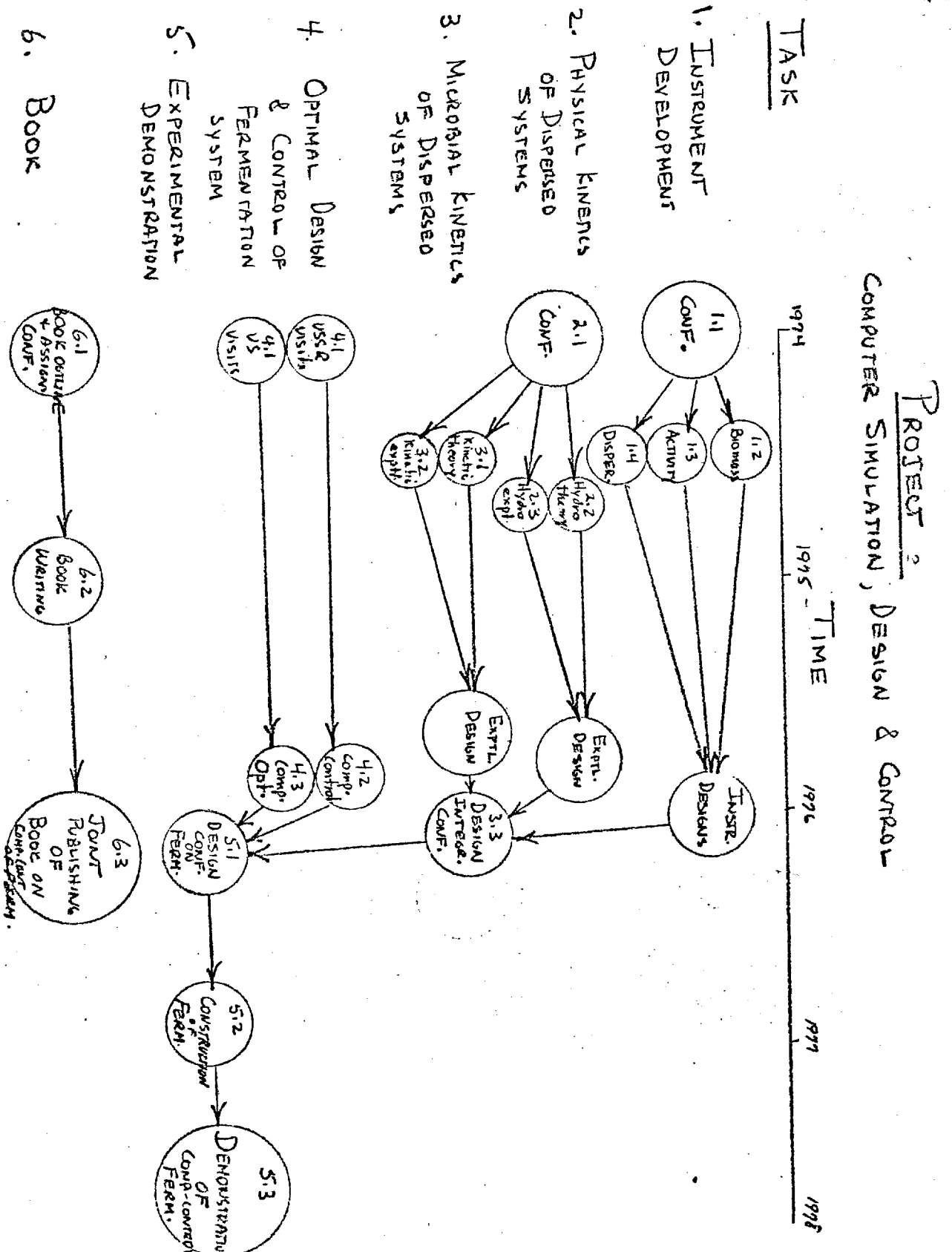
PROJECT NO. 5

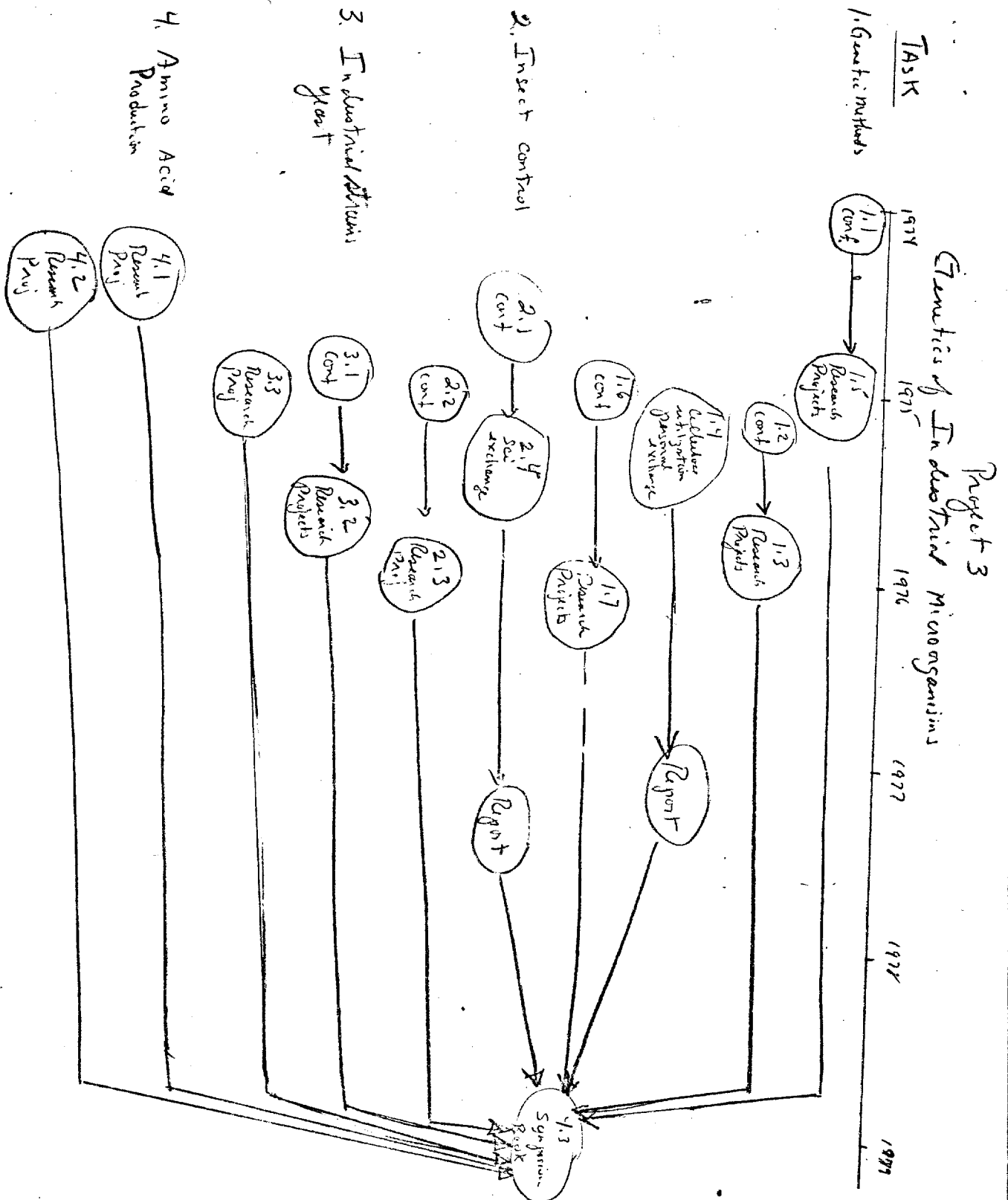
PROJECT TITLE Microbiological Control of Pests of Agricultural Crops

PROJECT COORDINATORS Dr. A. Heimpel, USDA, USA and Dr. Olga A. Alioshina

TASK NUMBER	NAME OF TASK OR SUB-TASK	NAME OF PARTICIPANTS AND COOPERATING INSTITUTIONS	DATE AND DURATION OF TASK	FORMS OF COOPERATION	EXPECTED RESULTS
1	Production of Viruses				
1	Exchange of cell lines & publications	Ohio State Univ. ARS, Beltsville, Md. & Phoenix, Ariz.	Start 7/74 continual	Material & literature	Prepare of cooperative
2	Work planning meeting on problems on 2, 3, & 4	"	Early Fall 1974	Meeting in USSR 6-7 US 6-7 USSR	Plan of cooperative program
3	Research on problems 2, 3, & 4	"	1974-1976	Cooperative research	Method for virus production and storage
4	Final meeting	"	June 1976	Meeting in U.S., all participants	Final report







Project 1

TOTAL BUDGET ESTIMATE

FIVE YEARS WITH PRIORITY

Development of Technology for Industrial Production and Utilization of Food and Feed
Proteins by Microbial Means, Including Research Into Different Aspects of Toxicity
and Biological Value

Task Number	Type of Task	Starting Date	Duration of Task	First Priority Estimated Budget (\$)	Second Priority Estimated Budget (\$)	Third Priority Estimated Budget (\$)
1	Clerical	July, 1974	5 Years	\$500	\$2000	\$2000
2A	Conference	July, 1974	3 Days	\$5000	\$9000	\$9000
2B	Conference	Sept., 1974	3 Days	--	\$9000	\$9000
3.2	Conference	Sept., 1974	1 Day	\$1000	\$1000	\$1000
4.1	Res. & Dev.	July, 1974	2 to 3 Years	\$50,000	\$110,000	\$250,000
4.2	Res. & Dev.	July, 1974	2 to 3 Years	\$50,000	\$110,000	\$250,000
4.3	Conference	Sept., 1975	1 Week	--	\$2000	\$2000
5.1	Res. & Dev.	July, 1974	2 to 3 Years	\$30,000	\$80,000	\$160,000
5.2	Res. & Dev.	July, 1974	2 to 3 Years	\$30,000	\$80,000	\$120,000
6.1	Res. & Dev.	July, 1974	2 to 4 Years	\$50,000	\$100,000	\$250,000
6.2	Res. & Dev.	July, 1974	2 to 3 Years	--	\$80,000	\$100,000
6.3	Res. & Dev.	July, 1974	2 to 3 Years	--	\$100,000	\$200,000
6.4	Workshop	Sept., 1974	2 Months	--	\$20,000	\$35,000
7.1	Res. & Dev.	July, 1975	2 to 3 Years	--	\$80,000	\$80,000
7.2	Res. & Dev.	July, 1975	2 to 3 Years	--	\$80,000	\$80,000
8	Res. & Dev.	July, 1974	3 to 5 Years	\$40,000	\$150,000	\$450,000

TOTAL FOR FIVE YEARS

\$256,500 \$1,013,000 \$1,998,000
(1st Priority) (2nd Priority) (3rd Priority)

BUDGET TIMING OVER FIVE YEARS

Project No. 1

FIRST PRIORITY

Task No.	1st Year	2nd Year	3rd Year	4th Year	5th Year	Subtotal for 5 Years
1	\$500	0	0	0	0	\$500
2A	\$5000	0	0	0	0	\$5000
2B	0	0	0	0	0	0
3.2	1000	-	-	-	-	\$1000
4.1	25,000	25,000	-	-	-	50,000
4.2	25,000	25,000	-	-	-	50,000
5.1	20,000	10,000	-	-	-	30,000
5.2	20,000	10,000	-	-	-	30,000
6.1	30,000	20,000	-	-	-	50,000
6.2	-	-	-	-	-	0
6.3	-	-	-	-	-	0
6.4	-	-	-	-	-	0
7.1	-	-	-	-	-	0
7.2	-	-	-	-	-	0
8	20,000	20,000	-	-	-	40,000
Total	\$146,500	\$110,000	0	0	0	\$256,500

BUDGET TIMING OVER FIVE YEARS

Project No. 1

SECOND PRIORITY

Task No.	1st Year	2nd Year	3rd Year	4th Year	5th Year	Subtotal for 5 Years
1	\$1000	\$500	\$500	-	-	\$2000
2A	\$9000	-	-	-	-	\$9000
2B	-	\$9000	-	-	-	\$9000
3.2	\$1000	-	-	-	-	\$1000
4.1	\$55,000	\$55,000	-	-	-	\$110,000
4.2	\$55,000	\$55,000	-	-	-	\$110,000
4.3	-	\$2000	-	-	-	\$2000
5.1	\$35,000	\$45,000	-	-	-	\$80,000
5.2	\$30,000	\$50,000	-	-	-	\$80,000
6.1	\$45,000	\$55,000	-	-	-	\$100,000
6.2	\$40,000	\$40,000	-	-	-	\$80,000
6.3	\$45,000	\$55,000	-	-	-	\$100,000
6.4	-	-	\$20,000	-	-	\$20,000
7.1	-	\$40,000	\$40,000	-	-	\$80,000
7.2	-	\$40,000	\$40,000	-	-	\$80,000
8	\$50,000	\$50,000	\$50,000	-	-	\$150,000
Total	\$366,000	\$496,500	\$155,500	-	-	\$1,013,000

BUDGET TIMING OVER FIVE YEARS

Project No. 1

THIRD PRIORITY

Task No.	1st Year	2nd Year	3rd Year	4th Year	5th Year	Subtotal for 5 Years
1	\$1000	\$500	\$500	-	-	\$2000
2A	\$9000	-	-	-	-	\$9000
2B	-	\$9000	-	-	-	\$9000
3.2	\$1000	-	-	-	-	\$1000
4.1	\$100,000	\$100,000	\$50,000	-	-	\$250,000
4.2	\$100,000	\$100,000	\$50,000	-	-	\$250,000
4.3	-	\$2000	-	-	-	\$2000
5.1	\$60,000	\$70,000	\$30,000	-	-	\$160,000
5.2	\$40,000	\$50,000	\$30,000	-	-	\$120,000
6.1	\$50,000	\$60,000	\$150,000	-	-	\$250,000
6.2	\$40,000	\$50,000	\$10,000	-	-	\$100,000
6.3	\$80,000	\$80,000	\$40,000	-	-	\$200,000
6.4	-	-	\$35,000	-	-	\$35,000
7.1	-	\$40,000	\$40,000	-	-	\$80,000
7.2	-	\$40,000	\$40,000	-	-	\$80,000
8	\$50,000	\$70,000	\$110,000	\$110,000	\$120,000	\$450,000
Total	\$531,000	\$671,500	\$565,500	\$110,000	\$120,000	\$1,998,000

TOTAL BUDGET ESTIMATE

FIVE YEAR PLANNING FOR
PROJECT NO. 2

"Engineering Research and Development of Equipment and Methods for the Computerized Simulation, Design and Control of Processes for Microbial Technology"

Project Coordinators: Dr. Shamil Yenikev
Dr. Arthur E. Humphrey

<u>Task No.</u>	<u>Type of Task</u>	<u>Starting Date</u>	<u>Duration</u>	<u>1st</u> <u>Priority</u>	<u>2nd</u> <u>Priority</u>	<u>3rd</u> <u>Priority</u>
1.1	Conference	July 1974	1 week	10,000		
1.2	Research	July 1974	2 yrs.	130,000		
1.3	Research	July 1974	2 yrs.			
1.4	Research	July 1974	2 yrs.	USSR		
2.1	Conference	Sept. 1974	1 week	5,000		
2.2	Research	Jan. 1974	2 yrs.		65,000	
2.3	Research	Jan. 1974	2 yrs.	USSR		
3.1	Research	Jan. 1974	2 yrs.		65,000	
3.2	Research	Jan. 1974	2 yrs.	USSR		
3.3	Conference	July 1976	1 mo.	10,000		
4.1	2 Exchange Visits	1975-1976	1 yr.		24,000	
4.2	Research	July 1974	2 yrs.	180,000		180,000
4.3	Research	July 1974	2 yrs.		180,000	180,000
5.1	Conference	Fall 1976	2 weeks	10,000		
5.2	Research (consultation)	July 1976	1 yr.	USSR	5,000	
5.3	Consultation	Summer 1977	3 mos.	USSR	10,000	
6.1	Conference	Fall 1974	2 weeks			10,000
6.2	Conference & Consultation	Fall 1974	2 yrs.			50,000
6.3	Consultation & Publishing	Summer 1976	3 mos.			10,000
				345,000.	349,000.	430,000.
CUMULATIVE TOTALS				345,000.	694,000.	1,124,000.

VENT	EVENT NAME	ESTIMATED COST ¹	PRIORITIES HOH	PRIORITIES WB
1	3rd Meeting Working Group	----	----	----
2	Conference	\$7,000	A	
3	Conference	\$6,000	A	
4	Research Projects	^{30,000} \$75,000-\$150,000	A <i>High</i> B <i>Lower</i> C <i>Higher</i>	} <i>per Mr. B. ...</i>
5	Research Projects	\$40,000	B	
6	Annual Conference	\$15,000	C	
7	Research Projects	\$75,000-\$150,000	A Lower C Higher	
8	Exchange Personnel	\$75,000	B	
9	Conference	\$7,000	B	
10	Research Projects	\$75,000-\$150,000	B Lower C Higher	
11	Workshop	\$7,000	A	
12	Conference	\$5,000	B	
13	Research Projects	\$75,000-\$150,000	B Lower C Higher	
14	Research Projects	\$20,000	C	
15	Conference	\$5,000	C	
16	Conference	\$5,000	B	
17	Research Projects	\$25,000-\$50,000 ?	B C <i>Higher</i>	
18	Research Projects	\$50,000-\$100,000	A Lower C Higher	
19	Exchange Personnel	\$40,000	B	
20	Conference	\$4,000	C	
21	Research Projects	\$25,000-\$50,000	A Lower B Higher	
22	Research Projects	\$50,000-\$100,000	A Lower C Higher	
23	Exchange Personnel	\$40,000	B	
24	Conference	\$4,000	C	
25	Symposium	\$30,000	A	



Squibb & Sons, Inc.

Squibb Institute
Medical Research

Cable: ERSQUIBB NYK

Box 4000
New Brunswick, New Jersey 08540

February 26, 1974

Dr. J. M. Leise
Senior Staff Associate
to the Deputy Assistant
Director for Research
National Science Foundation
Washington, D.C. 20550

Dear Josh:

I have reviewed the priorities set by Harlyn Halvorson on the various events under Project 3 and am in complete accord with the ratings that he has established with one exception. Under event 4, I recommend we set 3 levels of operation for the three possible budgets: A - \$30,000, B - \$75,000, and C-\$150,000. I trust that you will notify us at an early date at what budgetary level we can expect to proceed.

With best wishes,

Sincerely yours,

William E. Brown

cc: Professor H. O. Halvorson
Dean A. E. Humphrey ✓

PROJECT NO. 4 BUDGET PLAN

FISCAL YEAR

PROJECTS	1974	1975	1976	1977	1978
(1) Polymery 74 Project 4, Task 6	\$10,000				
(2) Fermentable sugar Iowa State Project 4, Task 5.2	\$80,000	100,00	120,000	140,000	160,000
(3) Sugar from cellulose U. Cal. Berkeley Project 4, Task 5.1	\$80,000	100,000	120,000	140,000	160,000
(4) Acoustic Imaging Project 4, Task 4.2	\$60,000	80,000	100,000	120,000	140,000
First Priority Group	\$230,000	280K	340K	400K	460K
(5) Cleavage Reversal Corning Glass Project 4, Task 5.4	\$90,000	100K	110K	120K	130K
(6) Project 4, Task 5.3	-----	80K	100K	120K	140K

3/25/74

U.S.-U.S.S.R. Joint Commission
on Scientific and Technical Cooperation

U.S. WORKING GROUP ON MICROBIOLOGY

Dr. Joshua M. Leise (Chairman) 202-632/5989
Office of the Deputy Assistant
Director for Research
National Science Foundation
1800 G Street, N.W.
Washington, D.C. 20550

Dr. Arthur E. Humphrey (Co-Chairman) 215-594/7084
Dean, The College of Engineering
and Applied Science
University of Pennsylvania
107 Towne Building
Philadelphia, Pennsylvania 19174

Dr. William E. Brown
Director, Department of Microbiology
The Squibb Institute of Medical Research
Princeton, New Jersey 08540

Dr. Henry Bungay
Vice President for Research and
Development
The Worthington Chemical Company
Freehold, New Jersey 07728

Dr. Charles Cooney
Department of Nutrition and Food Science
Massachusetts Institute of Technology
Cambridge, Massachusetts 02139

Dr. Edmund Field
Consultant
American Oil Company
5719 South Kenwood Avenue
Chicago, Illinois 60637

- 2 -

Dr. Harlyn O. Halvorson
Professor of Molecular Biology
Brandeis University
Waltham, Massachusetts 02154

Dr. Arthur M. Heimpel
Plant Protection Institute
Bio-Science Bldg., Room 214
U.S. Department of Agriculture
Beltsville, Maryland 20704

Dr. George Tsao
Program Director
Division of Advanced Technology
Applications
National Science Foundation
Washington, D.C. 20550

Dr. Daniel I. C. Wang
Department of Nutrition and Food Science
Massachusetts Institute of Technology
Cambridge, Massachusetts 02139

3/25/74

3/15/74

U.S.-U.S.S.R. Joint Commission on
Scientific and Technical Cooperation

U.S. WORKING GROUP ON MICROBIOLOGY

U.S. Project Coordinators

Chairman

Dr. Joshua M. Leise
Office of the Deputy Assistant
Director for Research
National Science Foundation
1800 G Street, N.W.
Washington, D.C. 20550

202-632/5989
RCA TELEX: 24521
NASCN UR
Western Union:
89-2438 NATSCIFOUN

Project Coordinators

1. Development of Technology
for Industrial Production
of Food and Feed Proteins
by Microbial Means

Dr. Daniel I. C. Wang
Department of Nutrition and
Food Science
Massachusetts Institute of Technology
Cambridge, Massachusetts 02139

617-253/2126

2. Engineering Research and
Development of Instrumentation and
Methods for the Computerized
Simulation, Design and Control of
Processes for Microbial Technology

Dr. Arthur E. Humphrey
Dean, The College of Engineering
and Applied Science
University of Pennsylvania
107 Towne Building
Philadelphia, Pennsylvania 19174

215-594/7084

Where available, telex or TWX service
identified; otherwise only office
telephone numbers listed.

- 2 -

3. Molecular Biology of Industrial Microorganisms

Dr. Harlyn O. Halvorson
Professor of Molecular Biology
Brandeis University
Waltham, Massachusetts 02154

617-647/2431

4. Development of Methods of Producing and Using Enzymes and Other Biologically Active Substances for Agriculture

Dr. George Tsao
Program Director
Division of Advanced
Technology Applications
National Science Foundation
Washington, D.C. 20550

202-632/0648

RCA TELEX: 24521
NASCF UR

Western Union:
89-2438 NATSCIFOUN

5. Microbiological Control of Pests of Agricultural Crops

Dr. Arthur N. Heimpel
Plant Protection Institute
Bio-Science Building, Room 214
U.S. Department of Agriculture
Beltsville, Maryland 20704

301-344/2380

3/15/74

3/25/74

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U.S. WORKING GROUP ON MICROBIOLOGY

Dr. Joshua M. Leise (Chairman) 202-632/5989
Office of the Deputy Assistant
Director for Research
National Science Foundation
1800 G Street, N.W.
Washington, D.C. 20550

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